

General Chemistry
Mr. MacGillivray
Quiz #39:
pH Calculations II

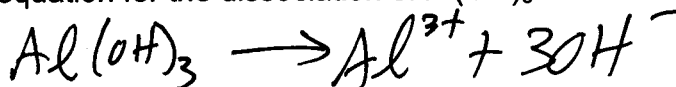
$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$\text{pOH} = -\log[\text{OH}^-]$$

$$\text{pOH} + \text{pH} = 14$$

$$[\text{H}_3\text{O}^+] \times [\text{OH}^-] = 1.00 \times 10^{-14} = K_w$$

1. Write the chemical equation for the dissociation of $\text{Al}(\text{OH})_3$ when it dissolves in water.



2. What is the $[\text{OH}^-]$ of 0.00567 M $\text{Al}(\text{OH})_3$ (aq)?

$$0.00567 \text{ mol Al}(\text{OH})_3 \times \frac{3 \text{ mol OH}^-}{1 \text{ mol Al}(\text{OH})_3} = \frac{0.0170 \text{ mol OH}^-}{\text{L}}$$

A 16.5 mL sample of 0.215 M NaOH required 30.3 mL of HCl solution to reach the endpoint of an acid-base titration.



3. Write the equation for the chemical reaction.

$$\frac{0.215 \text{ M} \quad ?}{0.0165 \text{ L} \quad \text{V} \quad 0.0303 \text{ L}} \\ \frac{0.00355 \text{ mol} \quad \text{V} \quad 0.00355 \text{ mol}}$$

4. Calculate the molarity of the original HCl solution.

(a)

$$M = \frac{n}{V}$$

$$n = MV = \left(0.215 \frac{\text{mol}}{\text{L}}\right) (0.0165 \text{ L})$$

$$= 0.00355 \text{ mol NaOH}$$

(c)

$$M = \frac{n}{V} = \frac{0.00355 \text{ mol}}{0.0303 \text{ L}} \\ = 0.117 \text{ M}$$

(b)

$$0.00355 \text{ mol NaOH} \times \frac{1 \text{ mol HCl}}{1 \text{ mol NaOH}} = \frac{0.00355 \text{ mol HCl}}{\text{L}}$$